

- 1 1. A circuit for determining temperature of an active semiconductor device, comprising:
 - 2 (A) a semiconductor substrate having thereon the active device;
 - 3 (B) a bridge circuit comprising:
 - 4 (i) a first thermal sensitive device disposed in thermal contact with an
 - 5 electrode of the active device, such first thermal sensitive device having a pair of
 - 6 terminals, a first one of the pair of terminals being connected to a first node and a
 - 7 second one of the pair of terminals being connected to a second node;
 - 8 (ii) a second thermal sensitive device disposed in thermal contact with the
 - 9 electrode of the active device, such second thermal sensitive device having a pair of
 - 10 terminals, a first one of the pair of terminals being connected to a third node and a
 - 11 second one of the pair of terminals being connected to a fourth node;
 - 12 (iii) a third thermal sensitive device disposed in thermal contact with the
 - 13 substrate, such third thermal sensitive device having a pair of terminals, a first one of
 - 14 the pair of terminals being connected to the second node and a second one of the pair
 - 15 of terminals being connected to the fourth node;
 - 16 (iv) a fourth thermal sensitive device disposed in thermal contact with the
 - 17 substrate, such fourth thermal sensitive device having a pair of terminals, a first one
 - 18 of the pair of terminals being connected to the first node and a second one of the pair
 - 19 of terminals being connected to the third node;
 - 20 (v) a voltage potential connected between the first node and the fourth node;
 - 21 (vi) an output provided by the second node and the third node.
- 1 2. The circuit recited in claim 1 wherein the first, second, third and fourth thermal
- 2 sensitive devices are resistors.
- 1 3. The circuit recited in claim 1 wherein the active device is a transistor.
- 1 4. The circuit recited in claim 2 wherein the first, second, third and fourth thermal
- 2 sensitive devices are resistors.

- 1 5. The circuit recited in claim 4 including a tuning circuit coupled to an output electrode
2 of the transistor, such tuning circuit having a tunable element controlled by a control
3 signal fed to such tunable element.
- 1 6. The circuit recited in claim 5 including a processor responsive to a voltage produced at
2 the output of the bridge and a signal representative of power fed to the transistor.
- 1 7. A circuit for determining temperature of an active semiconductor device, comprising:
2 (A) a semiconductor substrate having thereon the active device;
3 (B) a Wheatstone bridge circuit having in each of four branches thereof a thermal
4 sensitive device, one pair of such thermal sensitive devices being in thermal
5 contact with an electrode of the active device.
- 1 8. The circuit recited in claim 7 wherein another pair of such thermal sensitive devices is
2 in thermal contact with the substrate.
- 1 9. The circuit recited in claim 7 wherein the thermal sensitive devices are resistors.
- 1 10. The circuit recited in claim 9 wherein the active device is a transistor.
- 1 11. The circuit recited in claim 10 including a tuning circuit coupled to an output of the
2 transistor, such tuning circuit having a tunable element controlled by a control signal
3 fed to such tunable element.
- 1 12. The circuit recited in claim 11 including a processor responsive to a voltage produced
2 at an output of the Wheatstone bridge circuit and a signal representative of power fed
3 to the transistor.
- 1 13. The circuit recited in claim 12 wherein the output provided by the Wheatstone bridge
2 provides a measure of a temperature difference between the temperature of the
3 transistor and ambient temperature.

- 1 14. The circuit recited in claim 13 wherein the processor produces the control signal to
2 maximize power fed to the transistor and minimize power dissipated by such
3 transistor
- 1 15. The circuit recited in claim 7 wherein another pair of such thermal sensitive devices
2 is in thermal contact with the substrate.
- 1 16. The circuit recited in claim 15 wherein the thermal sensitive devices are resistors.
- 1 17. The circuit recited in claim 16 wherein the active device is a transistor.
- 1 18. The circuit recited in claim 17 including a tuning circuit coupled to an output of the
2 transistor, such tuning circuit having a tunable element controlled by a control signal
3 fed to such tunable element.
- 1 19. The circuit recited in claim 18 including a processor responsive to a voltage
2 produced at an output of the Wheatstone bridge circuit and a signal representative of
3 power fed to the transistor.
- 1 20. The circuit recited in claim 19 wherein the output provided by the Wheatstone bridge
2 provides a measure of a temperature difference between the temperature of the
3 transistor and ambient temperature.
- 1 21. The circuit recited in claim 20 wherein the processor produces the control signal to
2 maximize power fed to the transistor and minimize power dissipated by such
3 transistor.